DEPARTMENT OF THE AIR FORCE Item No. 38 (Pg 247) II-38-1

HEADQUARTERS AIR FORCE SPACE COMMAND
PETERSON AIR FORCE BASE, COLORADO 80914-5001

4 MAY 1988

CC

Advanced Launch System (ALS) Mission Need Statement (MNS)
(HQ USAF/XOX Msg, 1413002 Apr 88)

HQ USAF/XO

1. To support the 15 Aug 88 Defense Acquisition Board (DAB) Milestone 0/1 review for the ALS, we've prepared a MNS (Atch 1) that addresses DOD requirements for the ALS.

2. The MNS reflects the Air Force position on ALS outlined in the SAF/AQS "white paper." We've provided working drafts of the MNS to appropriate Air Staff action officers to help expedite the coordination process.

3. My staff is available to help ensure that all issues are resolved in a timely manner. My POC for this action is Colonel Vito Pagano, AV692-3635.

DONALD J. KUTYNA
Lieutenant General, USAF
Commander

1 Atch
ALS MNS, 4 May 88

cc: HQ AFSC/CC

FILE NUMBER
9.2

FOR THE

ADVANCED LAUNCH SYSTEM

1. Defense Guidance Element. The Advanced Launch System (ALS) will be a family of complementary launch vehicles that meet the following Defense Guidance (DG, dated 29 Mar 88): Policy Guidance, Chapter I, B; Strategy Guidance, Chapter II, D4, D5, P3, and P6b; Force and Resources Planning Guidance, Chapter III, C2, C3, and I8.

2. Mission and Threat.

a. Mission Area. This mission need statement addresses the OUSD(A) mission area of Space Launch and Orbital Support (410). The Defense Guidance (DG, dated 29 Mar 88) mission areas are Strategic Defense (Mid-Term Objective (MTO) 40) and Force Modernization (MTO 215 and 217). Additionally, two Air Force Space Command Statements of Operational Need (SON) for the ALS family of vehicles are in the validation process.

b. Mission Area Need. The Air Force is currently acquiring a family of expendable launch vehicles to provide assured access to space for national security payloads. The ability of this family of expendable launch vehicles (Titan II, Delta II, MLV II, and Titan IV) to meet the Department of Defense's growing need for more affordable, reliable, and responsive access to space is inadequate. Additionally, the requirement to support the expanded growth in both payload mass and launch rate necessary to deploy a future Strategic Defense System (SDS) cannot be accommodated within existing launch capabilities. A new family of launch vehicles that can provide responsive, reliable, flexible, low cost access to space for the broad range of expected payload sizes, orbits and launch rates is essential to satisfy national security launch requirements in the late 1990s and beyond.

c. Threat. The operational environment of future launch vehicles contains several key threats:

(1) Espionage. Information collection (especially during peacetime) about national security payloads and/or launch vehicle technologies.

(2) Sabotage. Physical threats to the launch vehicle and payload, including threats against assembly, check-out, and launch facilities.

(3) Electronic Warfare. Threats to launch vehicle communications links and relays. Also, includes threats against "command destruct" communications links.

The primary concern addressed by the ALS is that national security launch requirements will exceed the nation's launch capacity, forcing a reduction in mission capability for critical future space systems and the continued use of current launch systems into the late 1990s at unacceptable cost.

d. Shortcomings of Existing Systems. Existing launch systems, including the Scout, Atlas, Titan II, Delta II, MLV II, Titan IV and the STS can support known launch mass requirements through the next decade, except for the deployment of an SDS. However, current systems cannot meet the need to significantly lower the cost of access to space, accommodate substantial increases in total mass or mass/launch to orbit, provide major improvements in the operational responsiveness of the launch process, and significantly increase the overall launch rate. To satisfy these requirements, the ALS family of vehicles must:

(1) Achieve a ten-fold reduction in the cost of putting a payload into orbit in comparison to the current cost of launching the Titan IV. This cost reduction is based on the anticipated high flight rate and large mass to orbit.

(2) Support a total payload mass to orbit requirement of 1,000,000 lbs per year beginning in 1998 and increasing to 5,000,000 lbs per year by 2000. (Reference orbit is Low Earth Orbit--East.)

(3) Support a total equivalent payload mass per launch requirement that ranges from 1,000 lbs to 220,000 lbs. (reference orbit is Low Earth Orbit--East)

(4) Provide a launch system reliability above 98%.

(5) Support a launch call-up of 30 days or less.

(6) Accommodate payload substitution within 5 days of launch.

(7) Provide a launch-on-schedule probability of 95%.

(8) Provide physical/transmission security at a level appropriate for the projected threat.

(9) Protect payload identity to a level appropriate for the classification assigned to the payload.

(10) Accommodate maintenance, logistics, launch, and control by routinely trained and assigned USAF personnel.

(11) Within the family of vehicles, provide a surge capability that, from an alert status, will support six missions within 5 days.

(12) Support a routine launch rate of at least 30 launches per year.

e. Timing. The ALS program must support three objectives: 1) in the near term, mature technology to develop a lower cost high launch rate/heavy lift vehicle required to deploy an SDS in the late 1990s. 2) As technology is matured, transition that technology to existing launch systems. 3) In the long term, develop a new family of ALS vehicles to satisfy operational assured access requirements across the spectrum of payloads with decisions keyed to corresponding development decisions for payloads the family will support.

3. Alternative Concepts. The possible alternatives to consider for satisfying these requirements are:

a. Use Existing Expendable Systems. This alternative will maintain dependence on current vehicle configurations with associated high costs and lack of lift capability, responsiveness, flexibility and reliability.

b. Expand Existing Expendable Systems. This alternative will modify existing launch vehicles to expand payload capacity and improve responsiveness. This alternative does not take full advantage of available new operations and manufacturing technologies to significantly reduce launch costs.

c. Develop New Systems. This alternative will make maximum use of available and near term technologies to satisfy cost reduction goals as well as responsive, flexible, and reliable assured access to space for the broad range of expected payload sizes, orbits, and launch rates.

d. Develop a Shuttle-Derived Vehicle. Although advocated by NASA, this alternative's high procurement and operations costs, driven by 20 year old technology, low sustainable flight rate, and the impact of either a Space Shuttle or Shuttle-Derived Vehicle failure on assured access to space, makes this an undesirable solution, not in keeping with mission needs.

4. Cooperative Opportunities Document. It does not appear that other Allied nations are involved in similar programs of the scope and capability anticipated for ALS. This program is not an attractive candidate for cooperative opportunities.

5. Technology Involved. The ALS family of vehicles will rely primarily on effective application of existing and emerging design, manufacturing, and operations technologies. The program avionics, software, structures/materials, aerothermodynamics, flight mechanics, ground and flight operations/manufacturing.

6. Funding Implications. RDT&E funding for FY88-94 are $150M, $200M, $200M, $225M, $250M, $275M, and $300M. RDT&E funding for FY90-94 indicate shared participation by Air Force and SDIO.

This funding level is insufficient to proceed into Full Scale Development for the SDS launch vehicle. Once a Milestone II (deployment) decision is made for the Phase I SDS, this profile must be adjusted.

7. Constraints. The ALS must be able to satisfy national security launch requirements for the late 1990s and beyond, while meeting all required environmental, safety, and security standards. It must reliably support the high launch rates and large payload mass to orbit, while reducing operating costs by an order of magnitude compared to present systems.

8. Acquisition Strategy. Management of the ALS will be jointly conducted by DOD and NASA with SDIO support. The Air Force will be the Program Manager. The cooperative agreement between Air Force and NASA will allow the best use of each agency's expertise and facilities. The ALS acquisition objective is to procure in a fully competitive manner a system that will lower operations costs by a factor of ten, while providing the responsiveness, reliability, flexibility and performance that significantly exceed current space systems.